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THE USE OF NETTING AS A BIRD MANAGEMENT TOOL IN VINEYARDS

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ABSTRACT: Vineyard bird control is an important issue both monetarily and practically. Each season vineyard managers face the real threat of significant crop loss to starlings and finches, as well as an assortment of other birds. The increased popularity of wine as a mainstream consumable has led to a higher crop value in this industry. Because of this, the grape growers can no longer ignore bird damage. Netting, now recognized as the best solution, creates an additional challenge for the grower. To take full advantage of this management tool, a working knowledge of the proper equipment, as well as recognition of the behavioral characteristics and effects of the pest birds, must be combined for maximum effect.

KEY WORDS: netting, starlings, robins, finches, pyrotechnics, NetMaster, vineyard, grape grower, bird damage

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INTRODUCTION

Vineyard bird damage is a growing concern for today's grape grower. The days of "letting the birds have their share" are long gone. Vineyard managers who dedicate their time and effort to higher yield and profits are facing a number of problems caused by bird damage. The most obvious is the completely missing grape. European starlings (*Sturnus vulgaris*), American robins (*Turdus migratorius*), and Cedar waxwings (*Bombycilla cedrorum*) will take whole grapes off the clusters, leaving the grower with a frustrating and expensive visual indicator that he has a problem. House finches (*Carpodacus mexicanus*) and a host of other small birds, generically referred to as "linnets" by most growers, will peck at the clusters of grapes causing damage that leads to insect damage and disease which will destroy the entire cluster. These species make up the bulk of today's grape growers pest species. There are also reported cases of California quail (*Lophortyx californicus*), Mourning dove (*Zenaidura asiatica*), Bullock's orioles (*Icterus bullockii*), Western tanager (*Piranga ludoviciana*), and even Coyote (*Canis latrans*) damaging wine and table grapes. However, these reports are scattered and suspect as these species are frequent visitors to vineyards for various other reasons and are more often than not, guilty by association.

Vineyard bird damage has become an important issue because of the rising value of varietal wine grapes. For example, four years ago Chardonnay wine grapes were worth \$888.73 per ton (1993 Final Grape Crush Report, California Department of Food and Agriculture) and now are selling for \$1,150.52 per ton (1997 Preliminary Grape Crush Report, California Department of Food and Agriculture). These prices reflect the average price per ton in California of one of several emerging varieties. Some growers have seen increases that are substantially higher than what is noted here. The increase can be traced to two basic sources. Wine has seen an increase in popularity and the supply of wine grapes has fluctuated greatly during the same period of time. The economic laws of supply and demand are now a factor in bird control. The grape grower has sought to capitalize on this business opportunity by increasing the level of

sophistication in vineyard management and, subsequently, his yield. The traditional 12/6 approach (12 feet between rows, 6 feet between vines) to vineyard layout is being replaced by row spacing as little as 6 or 8 feet and vertical trellising to allow 4 foot spacing between vines. Frost protection used to be burning tires in the vineyard (this really is a sign of progress). Now, sizable chunks of money are being spent on laser leveling, computerized weather monitoring stations, innovative irrigation options, and vineyard frost protection fans. Canopy management and trellising have almost become an art form. But the unsophisticated constant that remains is bird damage.

Every year growers lose acres of grapes to birds. With an average yield of three to four tons per acre of grapes, these losses quickly add up to thousands of dollars. Whole grapes gone, or clusters of pecked grapes oozing juice and attracting wasps, ants, mildew, and mold, or any combination of these, is enough to send sane, well-educated men and women scrambling for a shotgun at the first sight of a starling.

The traditional approach to bird control has remained basically unchanged for several years. Propane cannons, bird bombs, and whistles have been a well used constant in the vineyard. Noisemaking devices have been and will continue to be a good option for the grower as long as he has the time and resource to employ shooters who can move when and where the birds move to keep the pressure on. In addition, the Federal Migratory Bird Treaty allows one to take starlings. However, few field hands possess the ability to tell the difference, in flight, between starlings and other vineyard pests/visitors.

Visual scare devices such as mylar flagging or flashtape, scare eye balloons, hawk kites and scarecrows are proven to have limited effectiveness. These items work best when combined with noisemaking devices. Hazing of birds is really an attempt to make them feel uncomfortable enough to leave the area. Visual scare devices do make birds nervous, but only for a short period of time, after which hunger overcomes all other urges. The best use of these devices is in combination with a netting program that excludes birds from areas they are most comfortable in. These areas are usually perimeter zones that offer quick escape to available cover.

When these areas are netted, birds are forced to fly farther into the interior than they would otherwise. The presence of visual scare devices and noisemakers located in the "interior" area are much more intimidating than when used as stand alone techniques.

Biosonics and distress calls are a time tested and proven technique for effectively repelling birds from certain areas. However, only recently have they been promoted beyond their effectiveness in an attempted response to the "quick fix" that most growers seek. Here it is proven that throwing money and technology at a problem is not always the answer. While starlings are a vocal enough species to react to a distress call, most other vineyard bird pests are not. In addition, the risk of attracting birds to the area, that may have not paid as much attention otherwise, is very real with distress calls (Conover and Perito 1981). In an effort toward self-preservation, most birds react two distinct ways to a call made when in a predator's grasp. Birds will either leave the area in an all out attempt to escape, or they will flock up and come to investigate the source of the call in an effort to identify the predator in question for future survival. This second option is not what the grape grower has in mind when spending several hundred dollars or more for an electronic calling device.

Trapping is another option that has proven to be effective. Again, it is important to know the laws that apply when trapping, but once a grower has cleared that hurdle, he can count on some results. The most effective use of traps seems to involve the Modified Australian Crow Trap (Praster pers. comm.; Gadd 1996). When used for the entire year, one can actually begin to have an effect on the available breeding population of resident pest species. However, this technique also falls short of many growers' standards and expectations for the elusive "quick fix." While scoring high in the "visually rewarding" department, most trapping programs are not feasible for growers either because of public relations or the lack of available qualified personnel to implement the program.

The difference between success and failure with these techniques often times may not even depend on the individual grower's tenacity and effort. Instead, fluctuating population levels of migratory species often determine the level of damage. The availability of alternate food sources also plays a large role in the pressure birds will place on a grower. Just as the weather will influence a grape grower's cultural management practices, the success or failure of species', such as starlings or finches, breeding cycles will also have an impact on management practices in the vineyard.

NETTING

With all the other available options, netting has only recently been considered a viable tool for vineyard protection. The obvious objections come immediately to mind—it must be more expensive, more labor intensive and, in general, more hassle than it is worth to use in the first place. The use of netting has always assumed two basics: 1) you cannot use it if you have very much to cover; and 2) you cannot make it last long enough to pay for itself. Those who have considered it beyond this point realize that the option of physical exclusion, while attractive, must be too good to be true. The reality is that

netting is the best option available to the grower. In addition to offering total protection against bird damage, it is portable, easy to obtain, requires very little training or a skilled specialist to make it successful, and represents the only "install and forget" product that will solve a grower's bird problems.

It is now apparent that the grower with 2 acres, as well as the grower with 120 acres, can profit from using netting. Today we are seeing the "niche" grower who offers a specialized varietal wine grape that may cost a winery in excess of \$2,000 per ton. A 10-acre parcel of this crop can be entirely covered at a cost of roughly \$350 per acre. In addition to low-cost protection, growers have two types of netting available—reusable netting which has a five to seven year life expectancy, and disposable netting which may be used for one season and then thrown away. Reusable netting affords the grower the option of paying a higher cost initially to be rewarded by lower amortized costs over the course of the following five to seven years. This method allows some growers to see costs dip below \$100 per acre.

Netting is commonly used across the nation. California growers have learned to net the entire vineyard, when practical, and to combine netting and scare devices when it is preferable to net only those areas that receive the most pressure. East Coast growers net the entire vineyard (Fuller-Perrine and Tobin 1993), with some choosing to support the net overhead allowing access for equipment and workers under a net canopy. Growers in Canada have used netting that is five to six feet wide and installed it vertically (Murray unpubl. data 1997). This technique takes advantage of the fact that most Canadian growers use a vertical trellis system to maximize exposure to sunlight in a shorter growing season. By vertically netting down both sides, these growers cover the fruiting zone of the vine to protect the grapes.

A grower's general management practices including irrigation, choice of cover crop, disease control and insect control are affected by the use of netting. Most have felt that netting would get in the way of these other vital management practices. Planning to use netting has dispelled most worries. However, planning for netting and bird control, in general, has only recently become part of a grower's practice.

The "good ol' days" of grape growing allowed bird control to pass as an issue when large migratory flocks of starlings were an every other year occurrence. Present day California supports an impressive and imposing resident population of starlings that guarantee every year may be a bad bird year. Netting is most effective when draped over the vines creating a protective canopy. This is important especially to growers with starling problems, as starlings land in the canopy and work their way down to the fruit. Canopy coverage does not need to encase the vine, but rather exclude entry from the top and sides at the fruiting zone. Growers with robin and finch damage, on the other hand, must make sure that the netting fully encases the vine, as these two common pests feed from ground level up.

For row application, netting can be applied two basic ways. The most traditional has been to unroll the net the length of the row and then lift it in sections, placing it on

top of the vines. It is then spread down both sides of the canopy and either allowed to touch the ground or it is fastened underneath. The second and more developed method of net installation is the use of over the row application equipment. This equipment requires the use of a tractor and is considerably faster and less labor intensive than the more traditional approach. In addition, it makes care of the netting easier as the process is somewhat more developed.

APPLICATION AND REMOVAL OF NETTING

Growers have built several net application and removal systems over the years. Most devices relied on one of two principals—either make the net small enough to handle easily, or build the equipment big enough to handle almost anything. Conwed Plastics based in Minneapolis, Minnesota, manufactures extruded polypropylene netting in bulk rolls 14 and 17 feet in width and 5,000 feet in length. The net weighs between 230 to 280 pounds in this bulk form. In addition, Conwed also manufactures disposable netting, available in 17 feet by 20,000 feet rolls at a weight of 690 pounds. These physical characteristics have challenged many a vineyard equipment maintenance man over the years.

In 1998, the first commercial bulk roll applicator becomes available. The "NetMaster" handles the same rolls but breaks from the convention of "over the row" suspension of the bulk rolls. Instead the netting lies on a trailer, parallel to the row and direction of travel and, most notably, about 18 inches above ground level. The net is then hydraulically paid off the roll and distributed over the row by a bar and sweep assembly. This process is safer, easier to use, and faster than the conventional over the row bulk roll applicators. Using this method allows the grower to cover 4 to 5 acres per hour with netting.

The next challenge the grower faces with netting is retrieval of the product with the intent of easy storage and reuse the following year. Previously, it was hydraulically or manually wound back onto a homemade 14 or 17 foot core. The effort to reproduce the manufacturer's tensioning of the netting would be made to maximize the amount of net stored per core. Needless to say, this process lends itself to net damage, sore arms, and a colorful vocabulary.

The NetMaster is comprised of three basic pieces of equipment—the bulk roll applicator, the net retriever, and the spool applicator. The net retriever is the key piece of equipment. Using the same sweep and distributor bar the bulk roll applicator uses, the retriever lifts the net off the vines and level winds it onto 24-inch spools. This method allows roughly 2,000 feet of netting to be wound onto a spool. The grower then removes the spool, marks which rows it was applied to, and stores it for reapplication the following year. This method of retrieval allows the grower to pick up 4 to 5 acres of netting per hour. In addition, spools with an overall length of 24 inches and a diameter of 24 inches are much easier to stack and store than a homemade "net on a core" assembly that is 14 or 17 feet long. The spool applicator allows the grower to hang the filled spools of net, weighing about 70 pounds, directly over the rows the following year for quick application.

The benefit to the grower in using a system like this is demonstrated in the following ways. Mechanization of the netting process allows the grower to realize the savings sought by using netting. It makes the application process faster and safer. It enables vineyard managers to allocate their labor resources to other tasks. It adds longevity to the net itself. Finally, it completely addresses the problem of vineyard bird damage. The retrieval of netting prior to harvest and reapplication the next year is the key to making netting a viable solution, practically and financially, for today's grape grower.

CONCLUSION

It is an overstatement to say that one piece of equipment or even one approach makes the battle of vineyard bird control an easy one. Years of research, effort, ingenuity, and trial and error have demonstrated that there is no easy solution. The use of netting as a bird management tool in vineyards can be viewed as literally as it is written—a management tool. Netting is the most effective tool, but the other techniques discussed here all have their merit. The grower that comes closest to winning the fight and making the most money with his crop is also the grower who understands that bird control, like so many other vital management practices, cannot be ignored. Vineyard bird control requires investment of time, money, and effort. These investments show the grower the basics of what is causing the damage and allow him to make the best decision about how to minimize that damage.

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